

# Introduction





# OK Wind Power Initiative and OREC

- ODOC/US-DOE fund OWPI July, 2000
- OWPI leads planning and fund-raising efforts for Wind Power Conference
- 375 attend conference on May 3, 2001
- Stakeholders meet May 4 to form group that will become OREC
- OREC helps host outreach events, e.g.: interim study, 2002 Conferences

# OREC's Mission

- **Serve as central voice for Oklahoma's renewable energy advocates**
- **Encourage Oklahoma to develop its renewable resources to:**
  - spur economic development
  - diversify the energy supply portfolio
  - help provide long-term energy security to its citizens and the country
  - improve the environment



# What does OREC do?

- Provide outreach to:
  - Utilities and transmission providers
  - Rural Economic Development groups
  - Landowners
  - Consumer Advocate groups
- Support incentives for economic development through renewable energy technologies:
  - ✕ Manufacturing
  - ✕ Technology Development
  - ✕ Research
- Form task force to work with state officials
- Provide media education
- Hold monthly meetings



# General Information

- Promotes wind, biomass, solar, other RE technologies
- 23 member organizations to date
- Over 60 attendees, including:
  - District Director for Congressman Frank Lucas
  - OK Secretary of the Environment Brian Griffin
  - State Representative James Covey
  - OK Department of Commerce
  - US Environmental Protection Agency
  - US Department of Energy
  - Williams Co.
  - Oklahoma Gas and Electric Co.
  - AEP/PSO
  - Utility-scale wind farm developers



# Who are members of OREC?

- Public officials and organizations
- Education and research institutions
- Native American interests
- Federal programs
- Advocacy groups
- Utilities
- Private sector



# Who are members of OREC?

- **Federal programs**

- DOE's Wind Powering America Initiative
- USDA Resource Conservation & Development
- NASA Experimental Program to Stimulate Competitive Research/ OK Space Grant Consortium

- **Citizens advocacy groups**

- Oklahomans United
- Sierra Club

- **Utilities**

- AEP-Public Service of Oklahoma



# Who are members of OREC?

- **Private Sector - small wind**
  - Bergey Windpower Company, Norman
- **Private Sector - large wind developers**
  - AEP Energy Services, Inc.
  - American Renewable Energy, LLC
  - Chermac Energy Corporation, Edmond
  - Clipper Windpower, LLC
  - Greenlight Energy, Inc.
  - Zilkha Renewable Energy, LLC



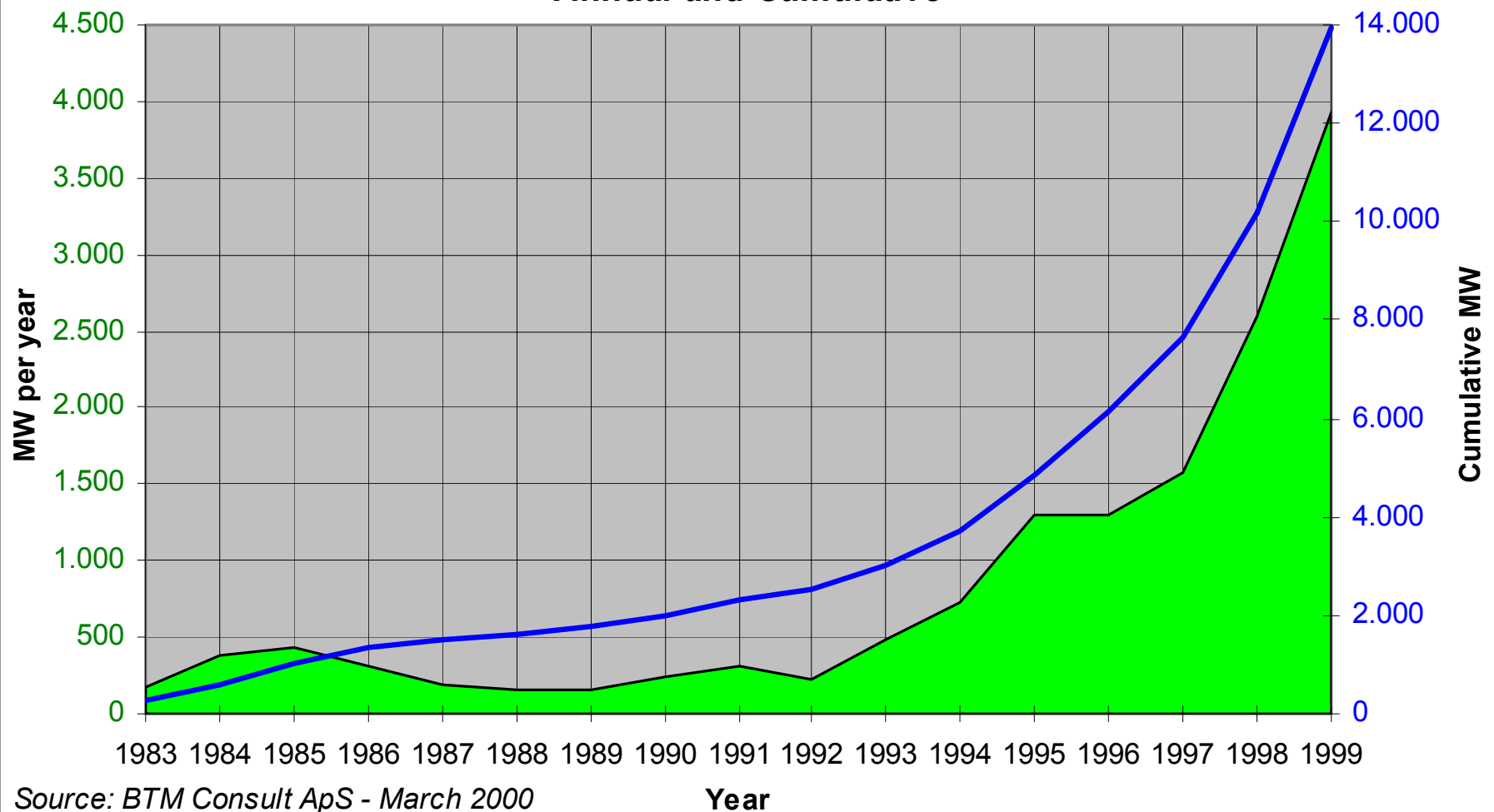




Before we  
begin the  
show,  
some notable  
figures.....

# Installed Wind Power in the World

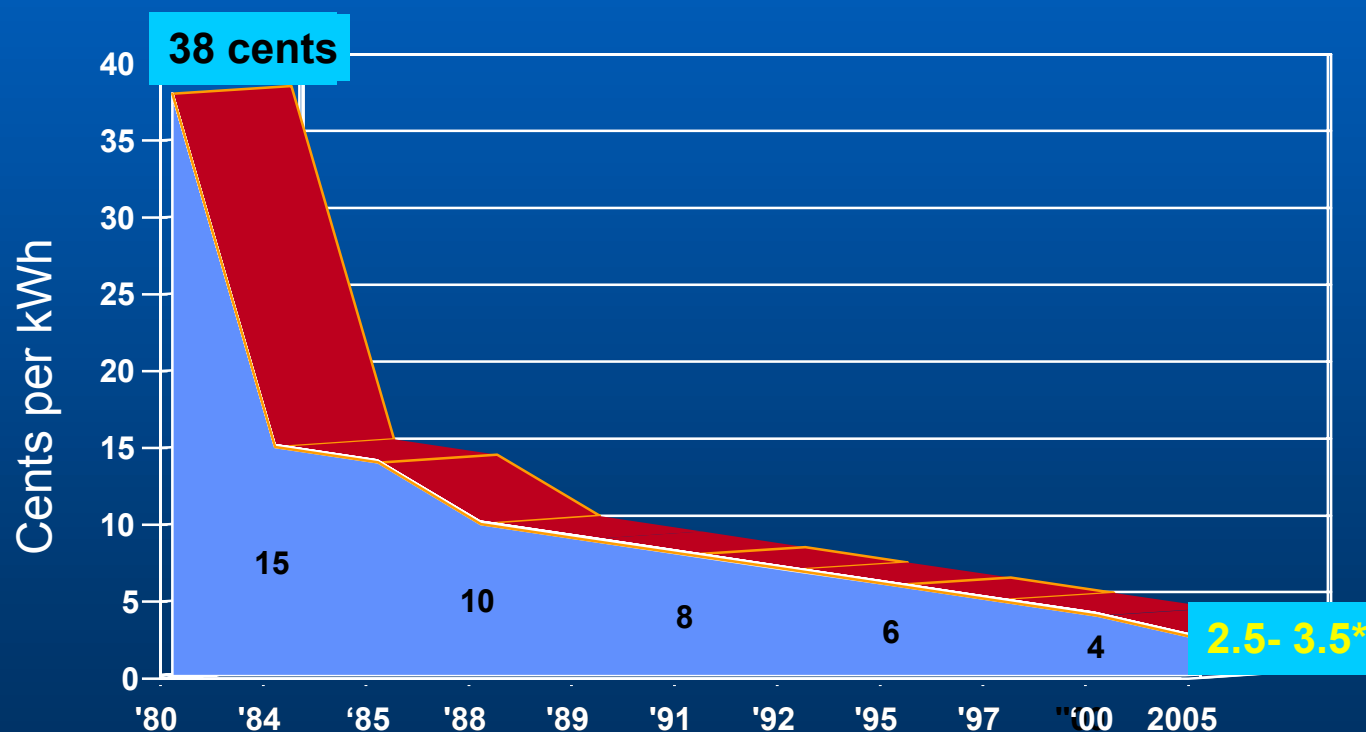
- Annual and Cumulative -





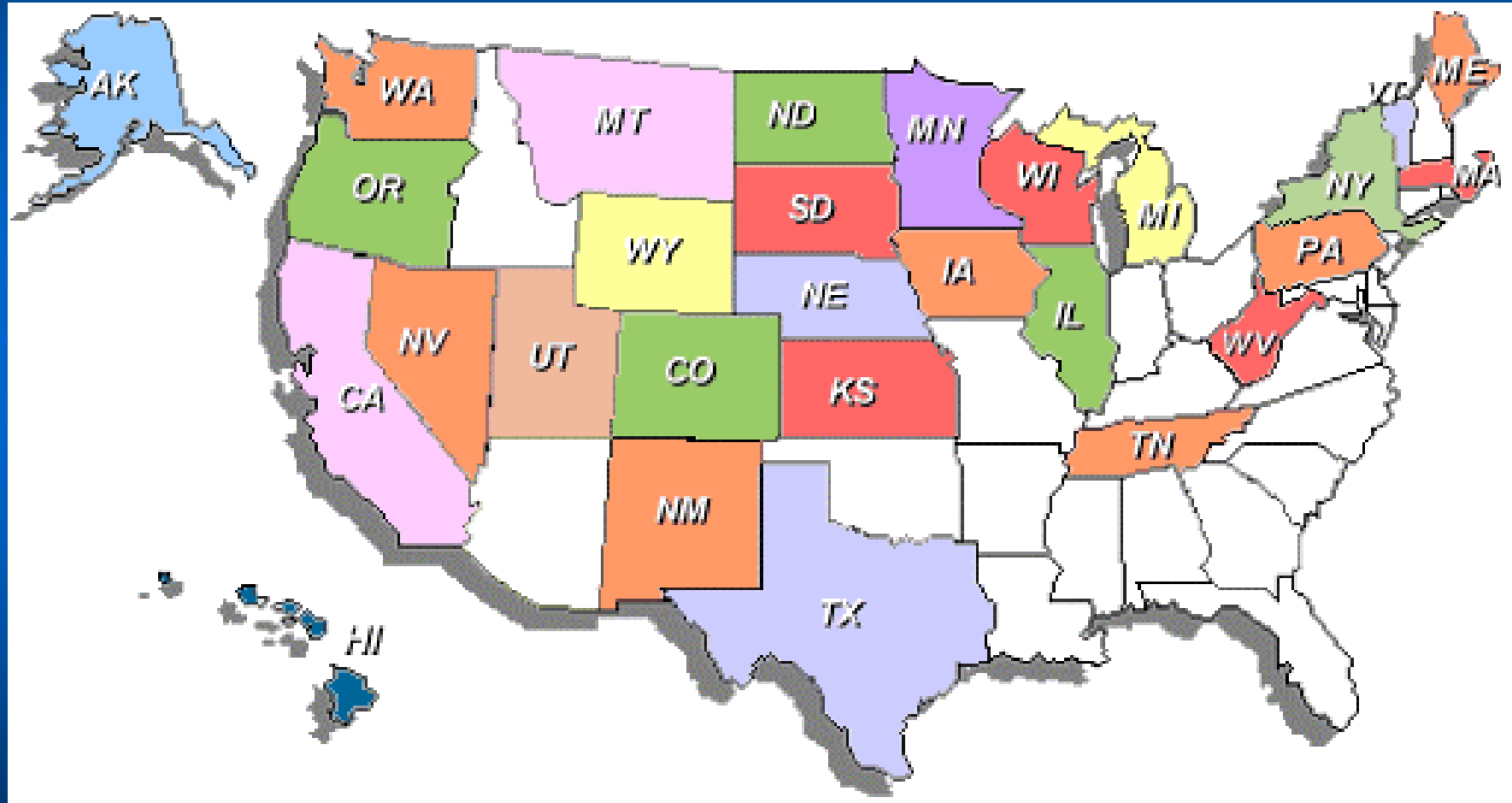
# Wind Energy:

*Cost of Wind-Generated Electricity  
1980 to 2005 Levelized Cents/kWh*

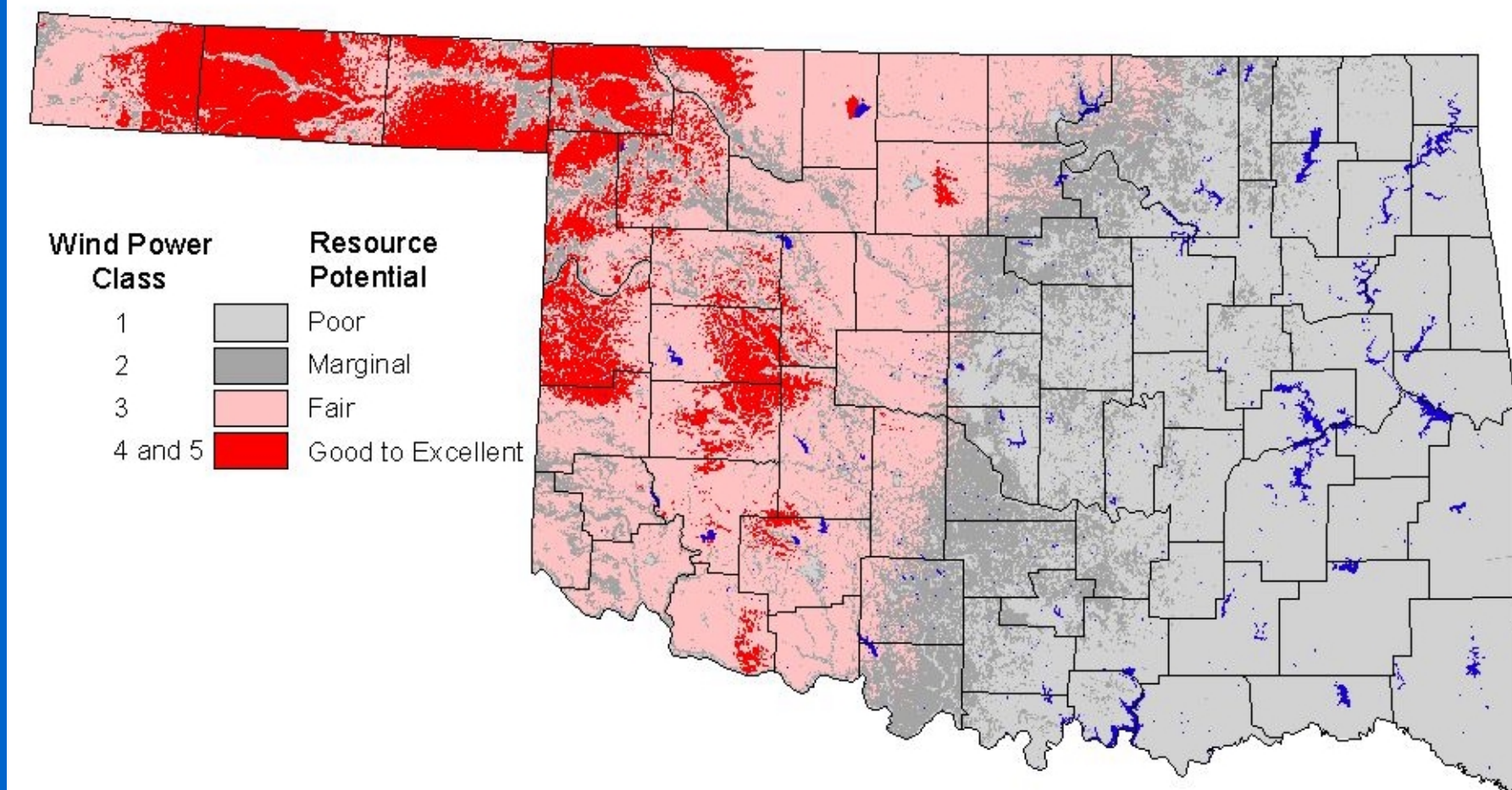


\* Assumptions: Levelized cost at excellent wind sites, large project size, not including PTC (post 1994)

# States With Active Wind Power Production



Source: American Wind Energy Association, Aug. 2001



## MODELED LONG-TERM AVERAGE WIND POWER DENSITY 50 METERS (164 FT.) Above Ground Level

OWPI

DRAFT 9/2001

# Acknowledgements

- **Zilkha Renewable Energy, LLC, for bringing speakers and providing lunch**
- **Bergey Windpower Co. for meeting space and literature**
- **Oklahoma Wind Power Initiative for information and logistics**





# Oklahoma Wind Power Initiative (OWPI)

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Tim Hughes  
OWPI Project Director  
University of Oklahoma

# Acknowledgements:

- Funding support from Oklahoma Department of Commerce and U.S. Department of Energy
- Co-Investigators:
  - OU: Mark Meo, Mark Shafer, May Yuan
  - OSU: Steve Stadler



# Why Study Wind Energy?



- Increased Energy Demand
- Improved technology
- Deregulation = markets
- Green energy mandates = growing markets
- Clean energy source
- Wind & gas complement each other as “fuels” for producing electric power in OK

# OWPI GOALS:

- Resource Assessment
- Policy Study
- Outreach
  - Educational programs
  - Community meetings
- **ECONOMIC DEVELOPMENT!**



# OWPI Wind Resource Assessment Goals

- **Phase I: Computer assessment to include consideration of:**
  - Mesonet wind data
  - Terrain data (from Digital Elevation Model)
  - Other Geographic Information Systems data sources (transmission lines, etc.)
  - Vegetation (roughness)

# Policy Assessment Goals

- What have other states done to promote wind power development?
- What will work in Oklahoma context?
- Make report to policy makers

# Outreach Goals

- Rural community meetings
- Monthly newsletter for stakeholders (“WinCharger”)
- K-12 educational materials development
- General public information (“Wind Power for Oklahoma”)

# Economic Development Goals

- **Teach landowners value of resource**
- **Attract out-of-state investors**
- **Encourage in-state investment**
- **Facilitate in-state location of wind related manufacturing opportunities**

# OWPI's Oklahoma Wind Climatology Products

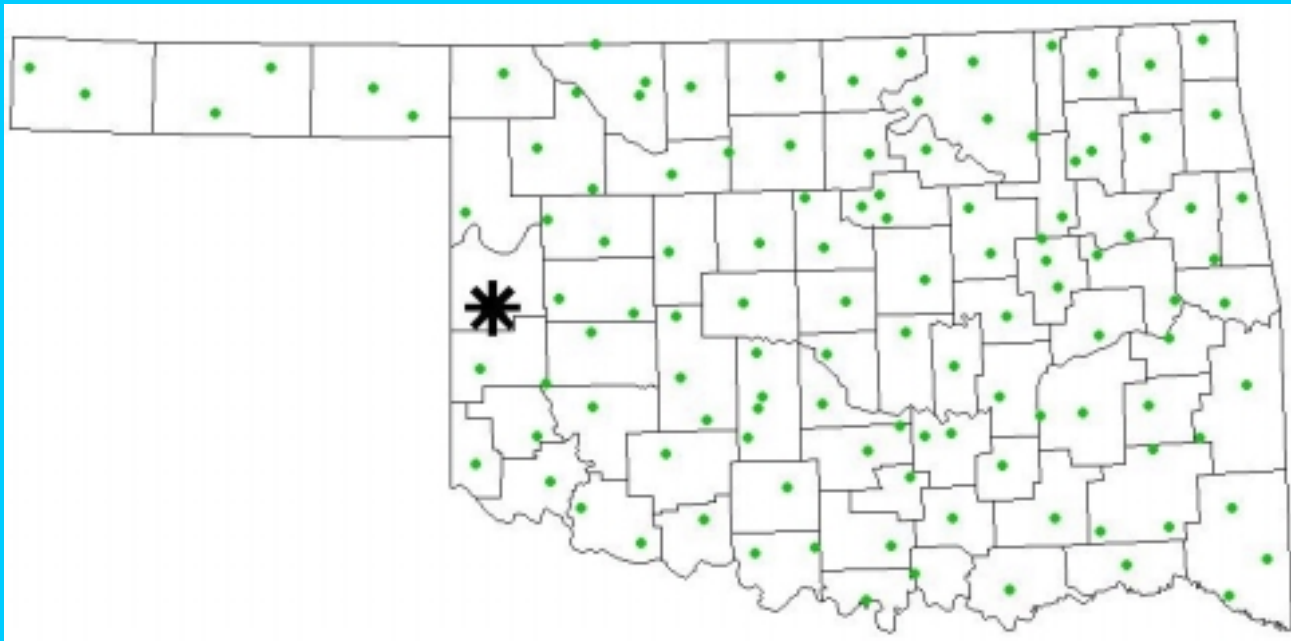


# Wind Climatology

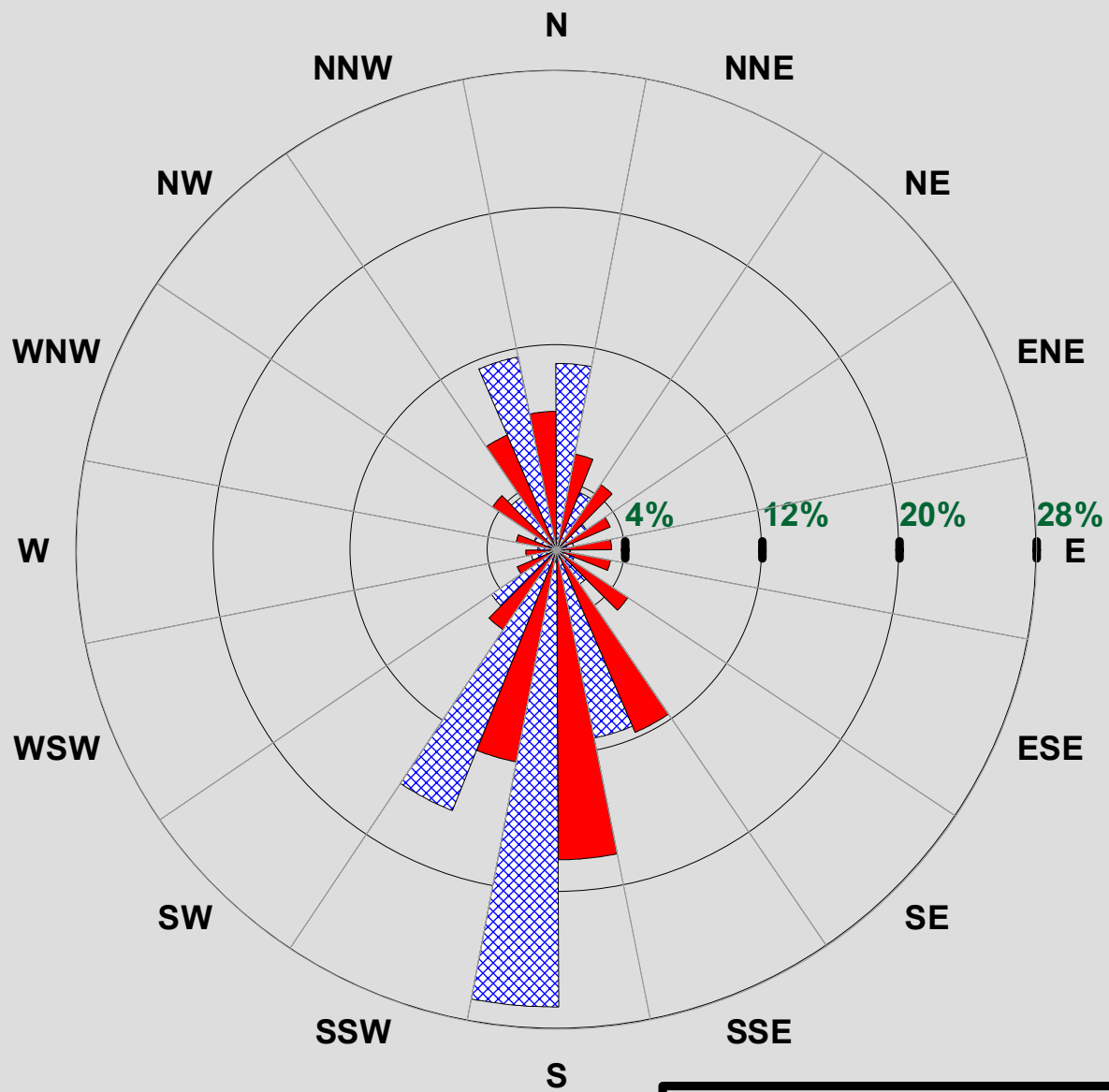
## Cheyenne Mesonet Site

### Station ID: CHEY

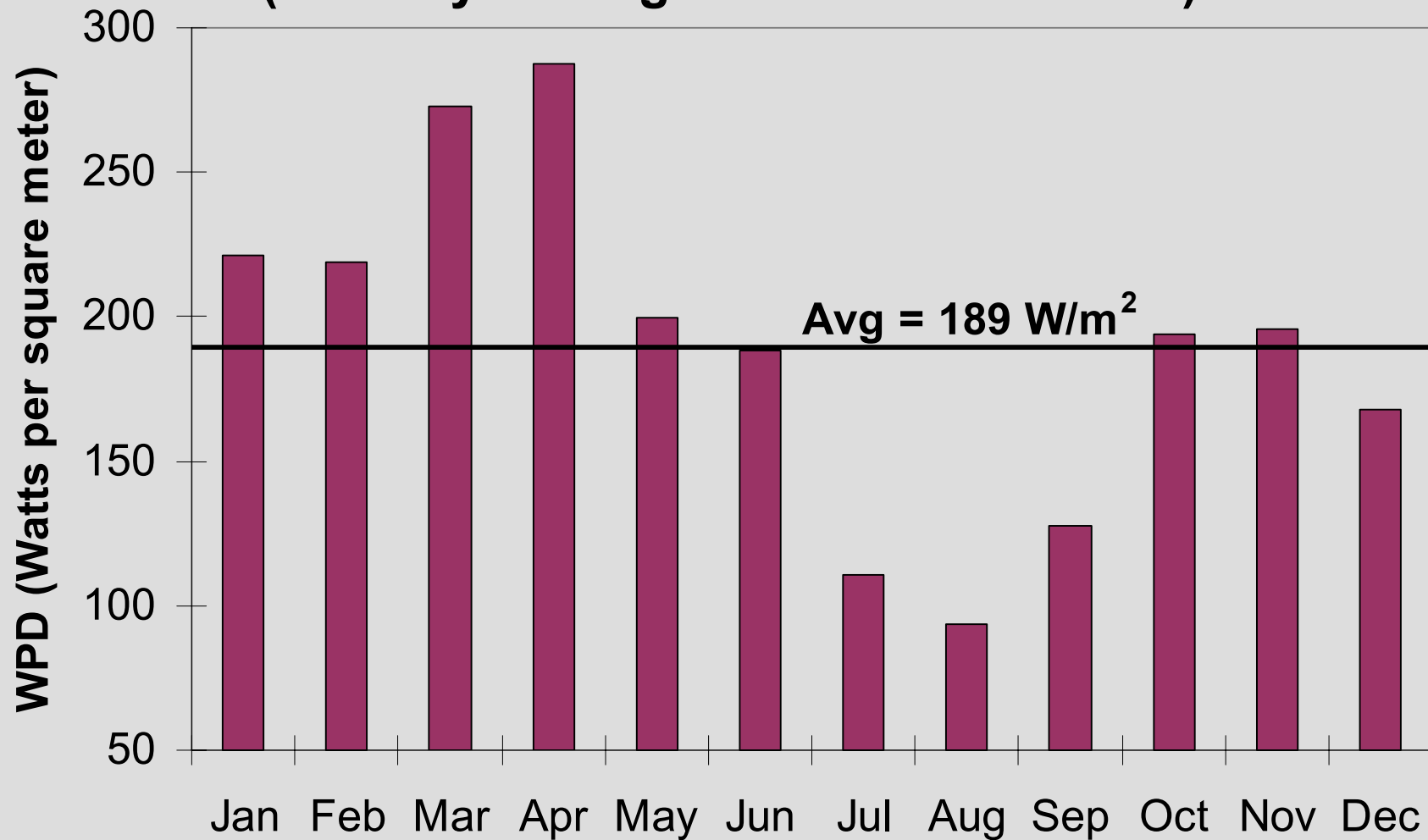
**Class 3 Site (January '94 – December '00)**  
**Average 10 m Wind Speed = 5.70 m/s (12.8 mph)**  
**Average 10 m Power Density = 189 W/m<sup>2</sup>**



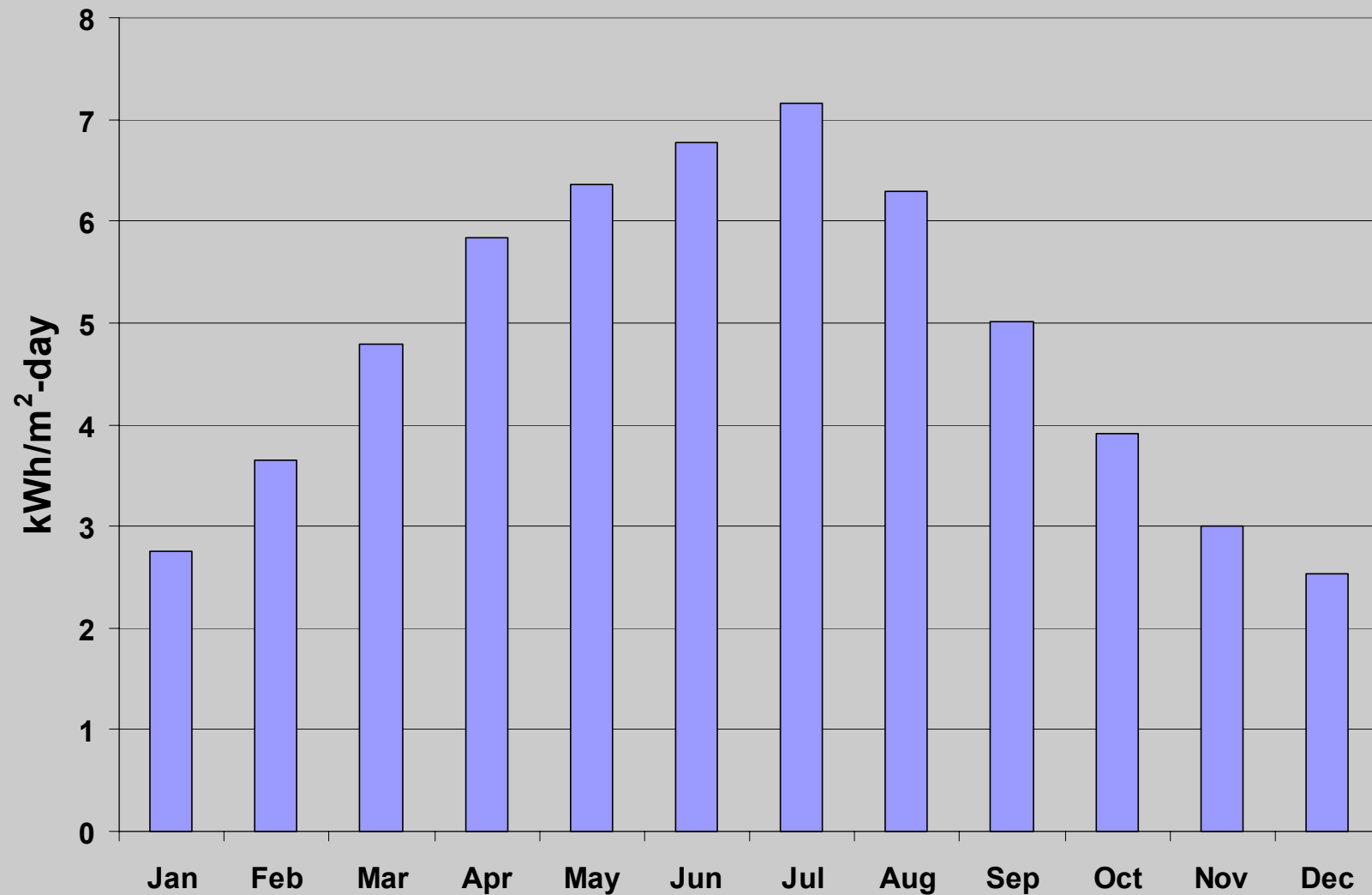




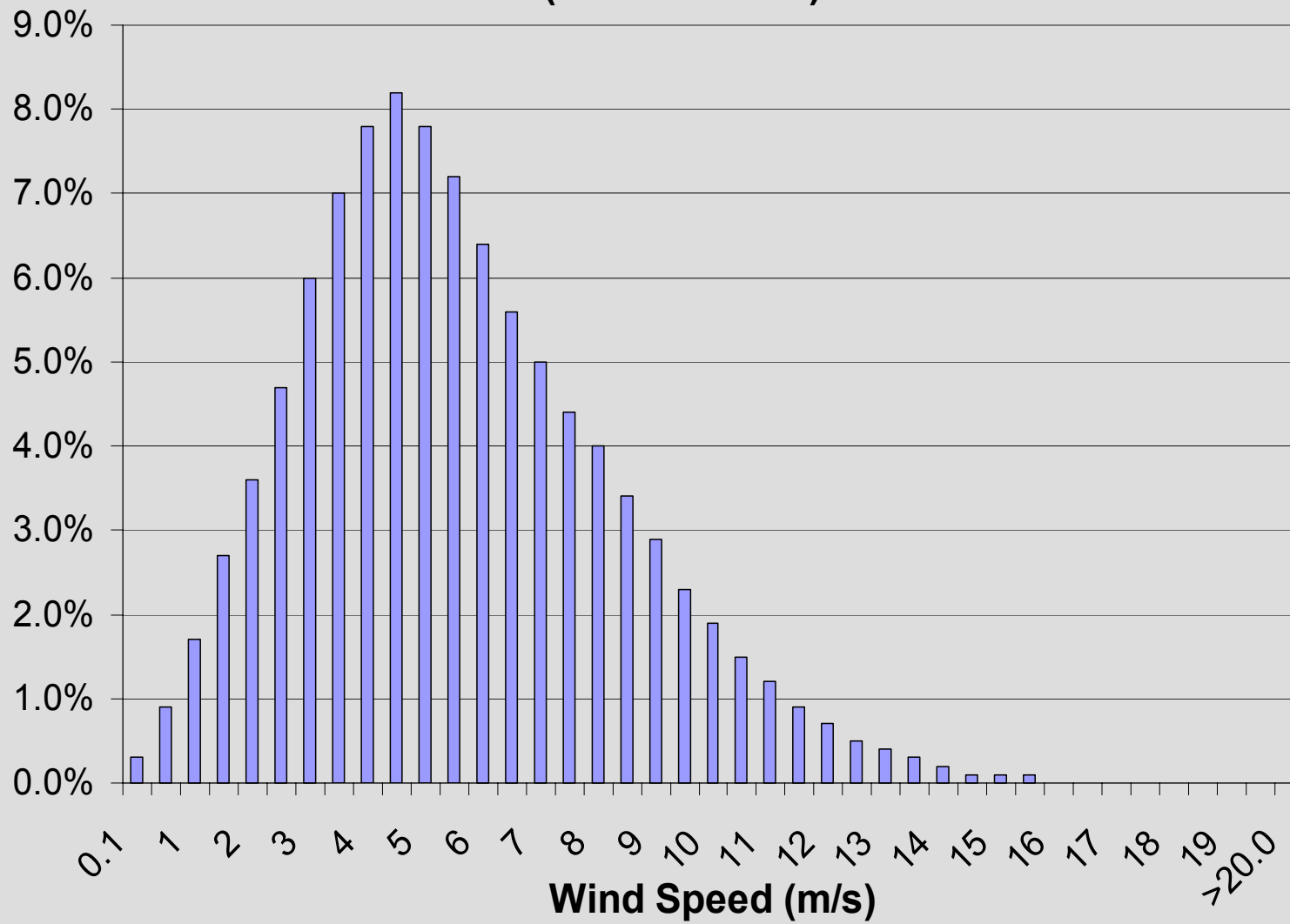
## Monthly Wind Power Density at 10 m (Monthly Averages over 1994 to 2000)



## **Cheyenne (1994-2000) Average Daily Global Horizontal Insolation (Solar Energy)**

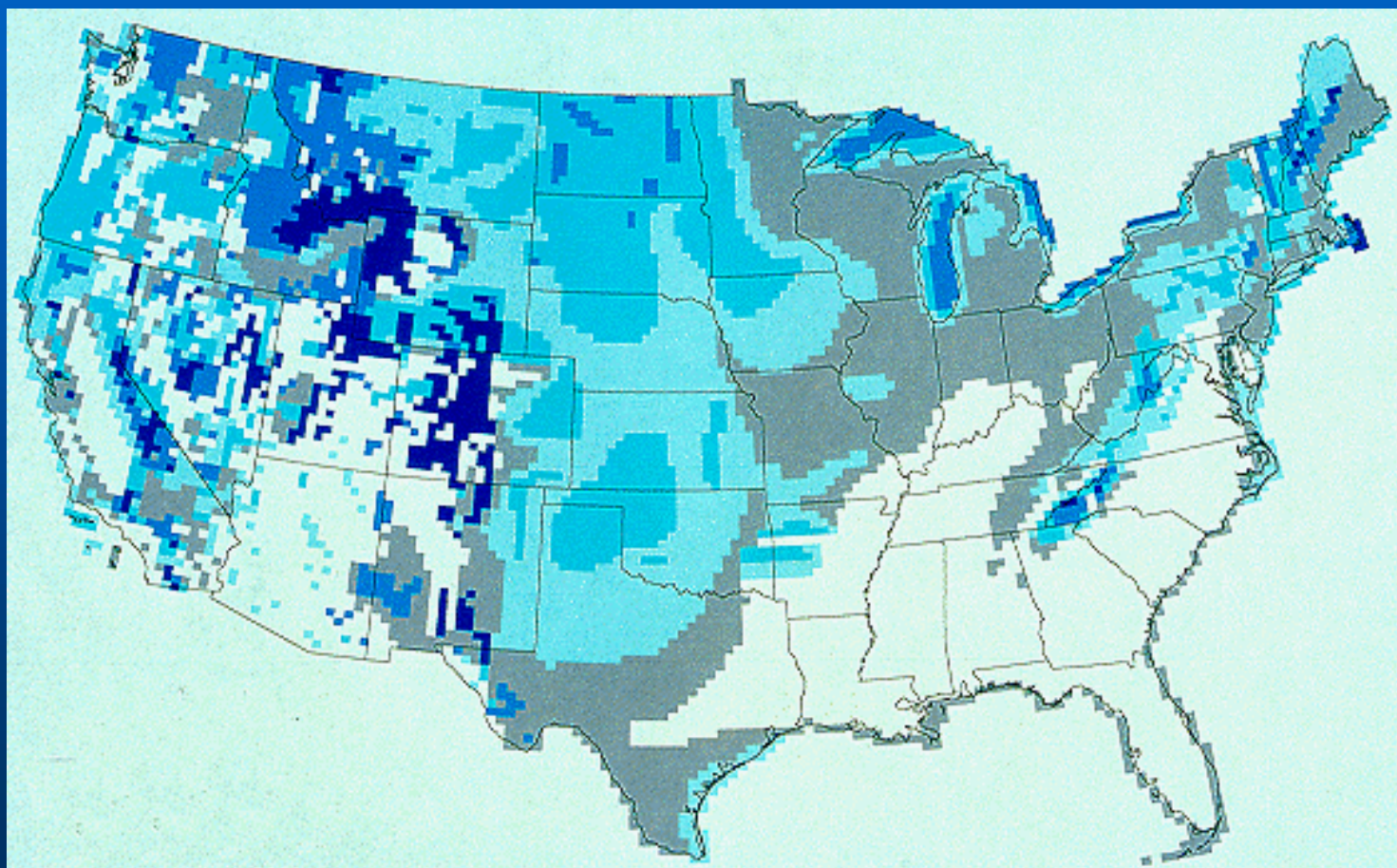


## Frequency Distribution of Winds (1994 to 2000)

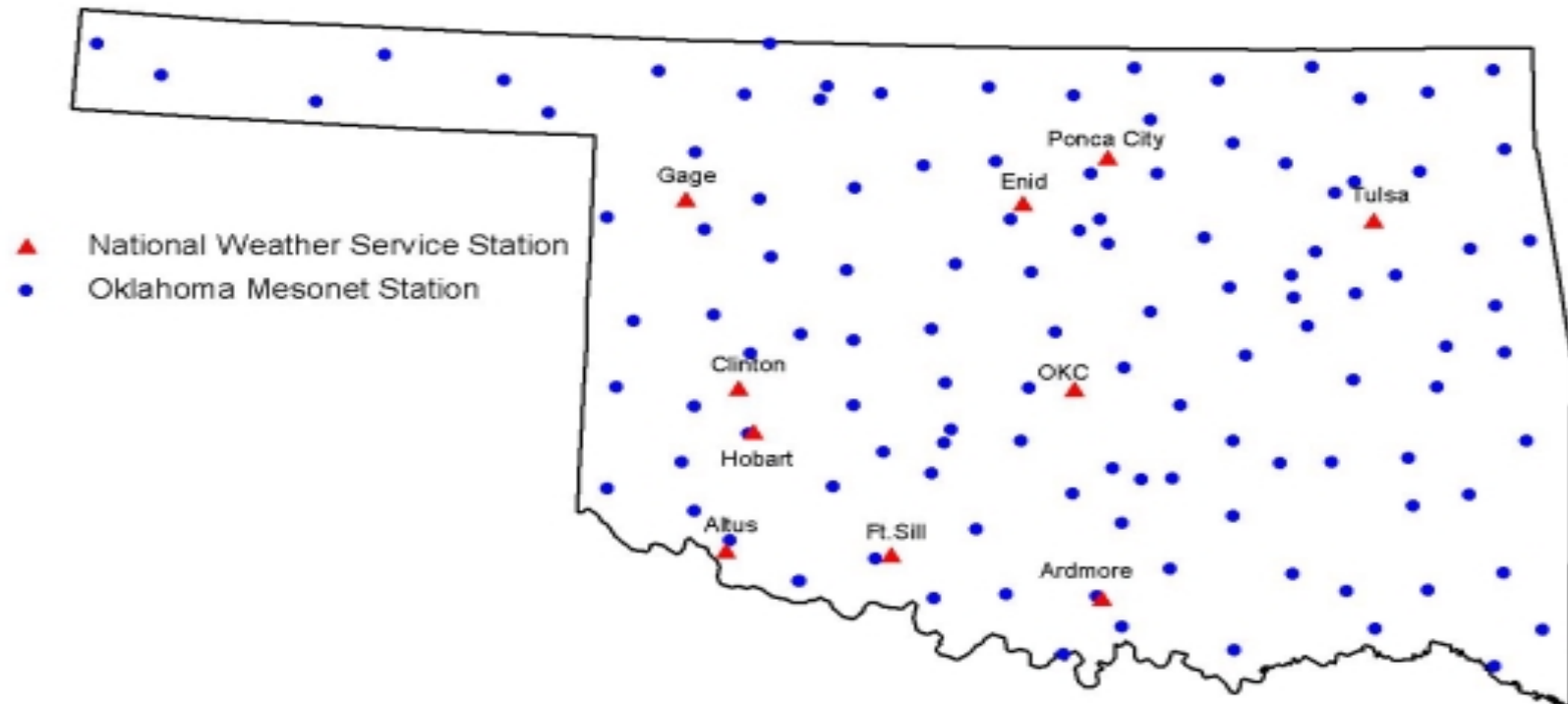


**OWPI's  
Oklahoma Wind  
Resource Maps**

## Existing Estimates are Coarse

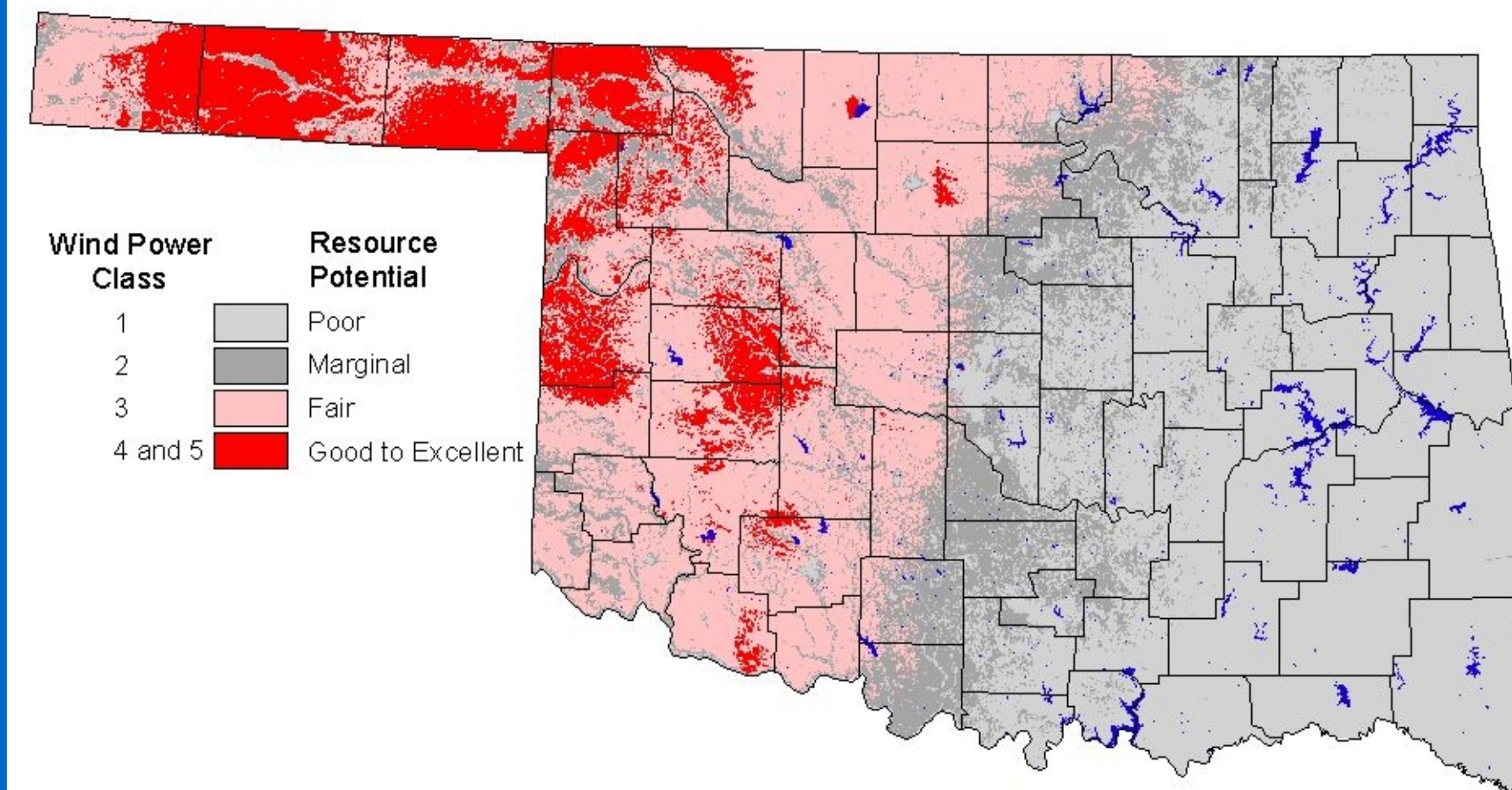


## Sites Used In Oklahoma Windpower Characterization



OWPI





## MODELED LONG-TERM AVERAGE WIND POWER DENSITY 50 METERS (164 FT.) Above Ground Level

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# Next Steps for OWPI:

- **Continue work to improve models**
  - determine reliability of assessment
  - use wind data from future tall towers to assess model accuracy and fine-tune



# Next Steps for OWPI

- **Seek suggestions for new products from:**
  - wind farm developers
  - wind farm investors
  - state officials
  - utilities
  - others

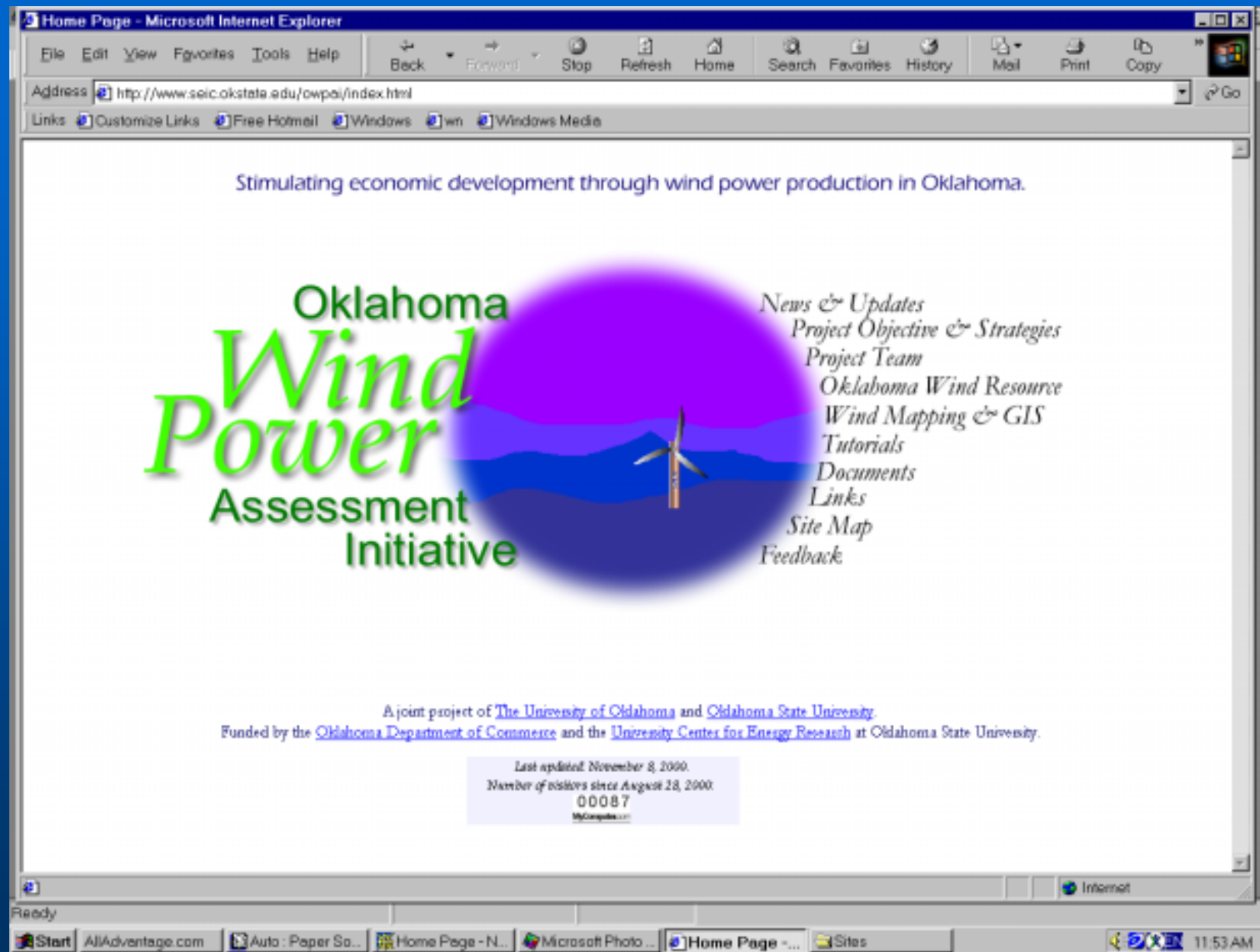


# Next Steps for OWPI

- **More outreach to:**
  - Landowners
  - Potential in-state investors
  - Technology Centers
- **Better sharing of products**
  - Improved web pages
  - Internet Map Server

For information on OWPI:

- Contact [thughes@ou.edu](mailto:thughes@ou.edu)
- [www.seic.okstate.edu/owpai](http://www.seic.okstate.edu/owpai)
- 'Wind Power for Oklahoma' handout (has contact info)
- 'Oklahoma WinCharger' newsletter



OWPI home-page: [www.seic.okstate.edu/owpai](http://www.seic.okstate.edu/owpai)